

## ABSTRACT OF THE DISCLOSURE

## METHOD AND APPARATUS FOR SEPARATING MATERIAL

10 (A) An apparatus for sorting particles composed of a mixture of particles with differing physical and chemical characteristics. The apparatus includes a comminutor for reducing the size of the particles. The apparatus includes a mechanism for removing particles from the inside of the comminutor which are intermediate in size between the feed to the comminutor and the product of comminution. The apparatus includes a mechanism for either discharging particles taken from the comminutor to a reject stream or providing them to a size classification apparatus such as screening. The apparatus includes a mechanism for returning the oversize particles to the comminutor or for discharging them to the reject stream. The apparatus includes an electric mechanism for separating particles with an electrical force disposed adjacent to a magnet mechanism. The apparatus includes a mechanism for providing the particles to the magnet mechanism and the electric mechanism and for providing triboelectric and capacitive charges to the particles. The providing mechanism is engaged with the magnet mechanism and the electric mechanism. The apparatus includes a mechanism for returning one of the products of electric and magnetic separation to the comminutor while discharging the other to the reject stream. A method for sorting particles composed of a mixture of particles with differing physical and chemical characteristics. The method includes the steps of reducing the size of the particles to liberate subcomponent particles. The method includes the steps of removing particles from the comminutor which are smaller than the feed to the comminutor but coarser than the product of comminution. The method includes the steps of providing the particles to a separation mechanism. Then there are the steps of separating the particles on the basis of size,

density, or electric and magnetic properties. Then there are the steps of returning the appropriate particles to the comminution device for further size reduction and of discharging the other particles from the comminution circuit.

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